

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

PRINS, A.W. -
VEREENIGDE

Nieuwe Parklaan 97
NL-2587 BN The Hague

PAYS-BAS
28 FEB. 2001

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Vb

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NRF2 15-9-2001

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

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TERMJN

28 FEB. 2001

Beantwoord
voorl.

bericht gezonden
aan

Date of mailing
(day/month/year)

23.02.2001

def.

dd

Applicant's or agent's file reference

MAP

P52498PC00

IMPORTANT NOTIFICATION

International application No.
PCT/NL00/00167

International filing date (day/month/year)
10/03/2000

Priority date (day/month/year)
15/03/1999

Applicant

COÖPERATIEVE VERKOOP- EN PRODUCTIE... et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Longo, E

Tel. +49 89 2399-8141







PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P52498PC00		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/NL00/00167	International filing date (day/month/year) 10/03/2000	Priority date (day/month/year) 15/03/1999	
International Patent Classification (IPC) or national classification and IPC A23L1/2165			
Applicant COÖPERATIEVE VERKOOP- EN PRODUCTIE... et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input checked="" type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 18/07/2000		Date of completion of this report 23.02.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Adechy, M Telephone No. +49 89 2399 8576 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/NL00/00167

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*

Description, pages:

1-23 as originally filed

Claims, No.:

1-33 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/NL00/00167

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 18, 33.

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 18,33 are so unclear that no meaningful opinion could be formed (*specify*):
see separate sheet
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims
	No: Claims 1-17, 19-32
Inventive step (IS)	Yes: Claims
	No: Claims 1-17, 19-32
Industrial applicability (IA)	Yes: Claims 1-17, 19-32



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/NL00/00167

No: Claims

2. Citations and explanations
 see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet



Re Item III

Non establishment of opinion with regard to novelty, inventive step and industrial applicability

The subject matter of claims 18 and 33 refers to examples of the description and this does not comply with Rule 6.2 (a) and Art 6 PCT, since the claims should be self understanding. Consequently, no opinion will be formulated with respect to the novelty, inventive step and industrial applicability of the subject-matter of these claims (Article 34(4)(a)(ii) PCT).

Re Item V

Reasoned statement under Article 35 (2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1) Reference is made to the following documents:

D1: VRIES DE J A: 'NIEUWE MOGELIJKHEDEN MET AMYLOPECTINE-AARDAPPELZETMEEL' VOEDINGSMIDDELEN
TECHNOLOGIE,NL,NOORDERVLIET B.V. ZEIST, vol. 28, no. 23, 1
November 1995 (1995-11-01), pages 26-27, XP002063172 ISSN: 0042-7934

D2: GB-A-1 232 497 (PROCTER & GAMBLE) 19 May 1971 (1971-05-19)

2) Novelty Art. 33 (1) and (2) PCT

The subject matter of claims 1, 19, 21, 23 and 24 concerns a snack food comprising high content amylopectin potato flakes, potato flakes and potato granules, the use of high content amylopectin potato granules and a method for preparing a snack food respectively. The subject matter of said claims lacks novelty in the light of D1 (the whole document). The said document discloses high content amylopectin potato used to manufacture snack foods and food granules and methods for making the same. In addition, D1 (on p. 27 2nd paragraph) teaches that in extruded potato starch, the use of amylopectin starch leads to decrease the expansion after frying and also it allows an improved control of the expansion properties of the product. The subject matter of claim 23 concerns the use of high amylopectin potato flake to increase the expansion of a



snack product, the said subject matter is unclear, since it does not indicate with the term "increase" to which part of the process it refers to and what it compares to.

Therefore, the subject matter of the said claim is not regarded as novel, since it is implicit from D1 that expansion properties can be controlled.

The same applies to dependent claims 2-4, 6-9, 15, 20, 22, 25-28, 30-32, for which subject matter is also disclosed in D1 (i.e. the form of high content amylopectin potato, the origin and proportions of amylopectin, the cooking mode of the snack food).

The subject matter of claims 1 and 18 is also known from D2 (example III).

The subject matter of dependent claims 5, 10-14, 16, 17 and 29 would be allowable only if they were related to independent claims complying with Art. 33 (1) - (3) PCT.

3) Inventive step Art. 33 (1) and (3) PCT

The problem underlying the present invention concerns snack foods having improved expansion and organoleptic properties, by means of incorporating high content amylopectin potato. The closest prior art is D1, concerning also snack foods containing high content amylopectin potato starch and having influence on expansion properties.

The subject matter is known from D1 and therefore it does not involve an inventive step. Claims 1-17, 19-32 do not comply with Art. 33 (1) - (3) PCT.

Re Item VIII

Certain observations on the international application

Expression such as "high amylopectin", "normal..." found in, e.g, claims 1 and 3 are obscure and render the subject matter of said claims unclear (Art. 6 PCT).

PATENT COOPERATION TREATY

EO/US
PCT/NL00/00167

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing: <p style="text-align: center;">21 September 2000 (21.09.00)</p>	
International application No.: <p style="text-align: center;">PCT/NL00/00167</p>	Applicant's or agent's file reference: <p style="text-align: center;">P52498PC00</p>
International filing date: <p style="text-align: center;">10 March 2000 (10.03.00)</p>	Priority date: <p style="text-align: center;">15 March 1999 (15.03.99)</p>
Applicant: <p style="text-align: center;">WAINWRIGHT, Andrew, Richard et al</p>	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:

18 July 2000 (18.07.00)

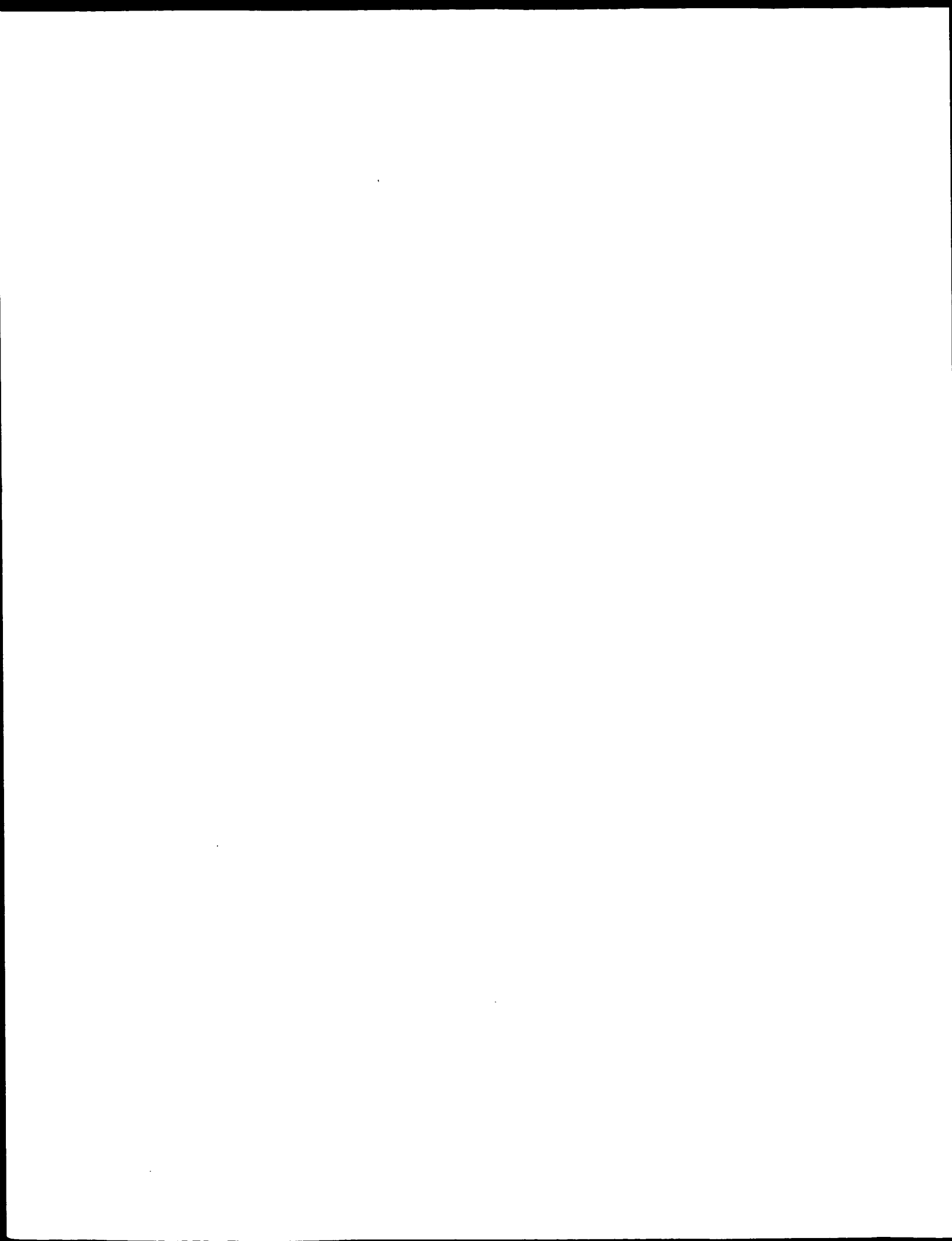
☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer: <p style="text-align: center;">J. Zahra</p> Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

OTTEVANGERS, S., U.
Vereenigde Octrooibureaux
Nieuwe Parklaan 97
NL-2587 BN The Hague
PAYS-BAS

Date of mailing (day/month/year) 30 June 2000 (30.06.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P52498PC00	
International application No. PCT/NL00/00167	International filing date (day/month/year) 10 March 2000 (10.03.00)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input checked="" type="checkbox"/> the inventor	<input type="checkbox"/> the agent <input type="checkbox"/> the common representative
Name and Address PAUL, Alexander, Thomas 7a College Square Stokesley Middlesborough Cleveland United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input type="checkbox"/> the person	<input type="checkbox"/> the name	<input checked="" type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence
Name and Address PAUL, Alexander, Thomas 7a College Square Stokesley TS9 5DL Middlesborough Cleveland United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned	
<input checked="" type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the elected Offices concerned	
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Sean Taylor
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

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PCT

From the INTERNATIONAL BUREAU

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

To:

OTTEVANGERS, S., U.
Vereenigde Octrooibureaux
Nieuwe Parklaan 97
NL-2587 BN The Hague
PAYS-BAS

(PCT Rule 47.1(c), first sentence)

NRF 2 15.9.2000

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St. rapp

Date of mailing (day/month/year)

21 September 2000 (21.09.00)

Applicant's or agent's file reference

MAPP52498PC00

IMPORTANT NOTICE

International application No.

PCT/NL00/00167

International filing date (day/month/year)

10 March 2000 (10.03.00)

Priority date (day/month/year)

15 March 1999 (15.03.99)

Applicant

COÖPERATIEVE VERKOOP- EN PRODUCTIEVERENIGING VAN AARDAPPELMEEL EN
DERIVATEN AVEBE B.A. et al

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

AU, KP, KR, US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AL, AM, AP, AT, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EA, EE, EP, ES, FI, GB, GD,
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,
NO, NZ, OA, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
21 September 2000 (21.09.00) under No. WO 00/54609

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

J. Zahra

Telephone No. (41-22) 338.83.38

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P52498PC00	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/NL 00/ 00167	International filing date (day/month/year) 10/03/2000	(Earliest) Priority Date (day/month/year) 15/03/1999
Applicant COÖPERATIEVE VERKOOP- EN PRODUCTIEVERENIGING VAN A		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2.



Certain claims were found unsearchable (See Box I).

3.



Unity of invention is lacking (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

AMYLOPECTIN POTATO FLAKES OR GRANULES AND THEIR USE IN SNACK FOODS

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures.



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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A23L 1/2165, 1/0522, 1/217, 1/164	A1	(11) International Publication Number: WO 00/54609 (43) International Publication Date: 21 September 2000 (21.09.00)
(21) International Application Number: PCT/NL00/00167 (22) International Filing Date: 10 March 2000 (10.03.00) (30) Priority Data: 9905903.2 15 March 1999 (15.03.99) GB (71) Applicant (for all designated States except US): COÖPERATIEVE VERKOOP- EN PRODUCTIE- ERENIGING VAN AARDAPPELMEEL EN DERIVATEN AVEBE B.A. [NL/NL]; Beneden Oosterdiep 27, NL-9641 JA Veendam (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): WAINWRIGHT, An- drew, Richard [GB/GB]; 19 Albert Road, Caversham, Read- ing, Berkshire RG1 7AN (GB). PAUL, Alexander, Thomas [GB/GB]; 7a College Square, Stokesley TS9 5DL, Middles- borough, Cleveland (GB). SCRIVEN, Fiona, Jane [GB/GB]; 24 Bishops Field, Aston Clinton, Aylesbury, Bucks HP22 5BB (GB). BATES, Lisa [GB/GB]; 4 Amity Street, Read- ing, Berkshire RG1 3LP (GB). (74) Agent: OTTEVANGERS, S., U.; Vereenigde Octrooibureaux, Nieuwe Parklaan 97, NL-2587 BN The Hague (NL).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: AMYLOPECTIN POTATO FLAKES OR GRANULES AND THEIR USE IN SNACK FOODS		
(57) Abstract <p>Snack foods are prepared, at least in part, from potato flakes and/or potato granules which are derivable from potatoes in which the starch has a higher than normal amylopectin content, for example, waxy potatoes. The snack foods have improved texture and appearance.</p>		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT

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CN	China	KR	Republic of Korea	PT	Portugal		
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DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

AMYLOPECTIN POTATO FLAKES OR GRANULES AND THEIR USE IN SNACK FOODS

The present invention relates to snack foods. More
5 particularly, it relates to snack foods comprising dehydrated
potato and to their manufacture.

Snack foods made from potato are well known, and are
available in a wide range of shapes and flavours. One form of
snack food derived from potatoes is the potato crisp, known in
10 the USA as the potato chip, which is commonly prepared by
slicing potatoes and frying the slices. It is also known to
manufacture snack foods by preparing a dough from dehydrated
potato material, forming that dough into pieces of desired
shape, for example by sheeting and subsequently cutting the
15 dough sheet, or by extrusion, and then frying or baking the
shaped dough pieces. The manufacture of snack foods from
dehydrated potato material has the advantages that it is easier
to maintain consistency of the product throughout the year in
spite of seasonal variations of potatoes and that a wider
20 variety of shapes can be made relatively easily. Potato flakes
and potato granules are forms of dehydrated potato which are
particularly well suited for use in the manufacture of snack
foods.

US5,429,834 describes preparation of snack products from a
25 dough based on ingredients such as potatoes which are high in
starch but lack gluten. It is suggested that the elasticity of

such doughs may be increased by adding a pregelatinised waxy starch such as pregelatinised waxy maize starch.

Despite the great variety of potato snack foods now available there remains a demand for improved snack foods, for example, potato snack foods having an improved texture.

The present invention provides a snack food comprising high amylopectin potato flakes and/or high amylopectin potato granules.

The starch of plants commonly consists of two types of glucose polymer, amylopectin and amylose. Amylopectin is highly branched and has a very high degree of polymerisation, for example, about 2,000,000. Amylose is, in contrast, linear or lightly branched and has a lower degree of polymerisation of about 1000 to 5000. Those differences in structure lead to significant differences in properties between amylopectin and amylose. For example, amylopectin is highly soluble in water and forms clear gels of reasonably stable viscosity. It is believed that that is because its high degree of branching prevents ordering of the molecules in solution. In contrast, amylose quickly crystallises out of aqueous solution. It follows that the properties of a starch from a given source will be dependent on the ratio of amylopectin to amylose.

There exist natural varieties of some cereals such as maize and rice in which the starch is substantially all amylopectin with less than 5%, and usually less than 2%, amylose. Maize of

which the starch consists of 100% amylopectin is known as waxy maize and the starch from waxy maize has since the 1940s found a number of applications, principally in paper manufacture but also as a thickener in foods. EP 0,314,320 A1 discloses snack
5 foods which comprise waxy maize masa and which are stated to have a different texture from equivalent foods made with dent corn. Nevertheless, waxy maize material other than isolated starch has not found wide application in snack foods.

The starch of potatoes typically consists of approximately
10 20% amylose and 80% amylopectin, although that ratio varies slightly according to the variety of potato and growing conditions. References herein to a normal amylopectin content in potato starch are intended to imply an amylopectin content of about 80% \pm 3%, dry weight basis. At present, there are no known
15 natural varieties of potato in which the starch consists substantially entirely of amylopectin. For a number of years, however, there have been available genetically modified potato plants which produce potatoes in which substantially all of the starch consists of amylopectin.

20 EP 0,703,314 A and the references therein describe genetically modified amylopectin potatoes (known as "waxy potatoes") and the use of the separated amylopectin potato starch from those potatoes as a wet-end additive in paper making. EP 0,799,837 A discloses the preparation of an aqueous

composition comprising amylopectin potato starch in combination with an emulsifier and suggests that such compositions may find application in products having a gel structure, for example, food products such as puddings, jellies and custard or in foods
5 having the form of viscous liquids such as sauces, creams and soups.

EP 0,703,314A and EP 0,799,837A describe applications of the starch isolated from the waxy potatoes. In contrast, the present invention is concerned, not with the separated starch,
10 but instead with the use of whole potato (less the skin) in the form of potato flakes and/or granules.

The expressions "high amylopectin potato flakes" and "high amylopectin potato granules" as used herein are to be understood as meaning potato flakes or granules, respectively, prepared
15 from potatoes of which the starch has an amylopectin content of 85% or more, advantageously 90% or more, preferably 95% or more, and more preferably 98% or more, dry weight basis. The flakes and granules are thus richer in amylopectin than flakes and granules made from the currently known natural potato varieties.

20 Although waxy starch in the form of isolated starch, for example, pregelatinised waxy maize starch, is known as an additive to potato doughs, the use of such starch as the sole solid component in a dough has been found to be unsatisfactory... leading to a highly uniform continuous starch matrix with a
25 relatively hard structure. Moisture is released only slowly

during cooking leading to a very even, but poorly expanded structure, with a harder texture compared to a dough made with high amylopectin potato flake.

The use of high amylopectin potato flakes and/or granules in accordance with the present invention has been found to give a more expanded product with an improved texture when compared to snacks prepared using potato flakes and/or granules having a normal level of amylopectin. The increased expansion and improved texture are unexpected, as snack foods prepared from pieces of high amylopectin potatoes, (that is from high amylopectin potato material that has not been dehydrated) have been found not to have the improved qualities of the snack foods according to the invention. It is believed that those improved qualities result from use of the potato flakes and/or granules in which there is combination of pregelatinised high amylopectin starch within a potato cell structure that remains partially intact. It is further believed that this is in part because the onset of the glass transition during cooking may be delayed in the snack food of the invention because the glass transition occurs in amylopectin at a given temperature at lower water contents than for amylose. During cooking of a snack food the starch is initially in a rubbery state but, as water is boiled away, the moisture content drops and the starch eventually passes into the glassy state, after which expansion of the snack food is thought substantially to cease. This transition will

occur later in high amylopectin potato starches than in normal potato starch, thus giving an increased time for expansion to occur.

The use of high amylopectin potato flakes and/or granules in accordance with the present invention has furthermore been found to improve the appearance of the snack food. In particular, surface characteristics of the snack food are such that the surfaces are more reflective and can be described as more "shiny" than comparable products made from conventional potato flake.

Methods of making potato flakes and granules are well-known in the art and are discussed in "Potato Processing", 4th Edition, Eds. W.S. Talburt and O. Smith, AVI, USA, 1987.

Preferably the high amylopectin potato content of the snack food is substantially all in the form of potato flakes. Methods of making potato flakes typically fall into two categories of process, which are known respectively as the low leach (or single stage) process and the standard (or three stage) process. In both processes the potatoes are peeled and sliced prior to heat treatment.

In the low leach process the sliced potato is cooked in hot water or steam (for example at 95°C to 100°C for 15 to 30 minutes) and is then mashed. In the standard process the sliced potatoes are heated in hot water or steam (for example at 70°C

for 20 minutes), then cooled (for example to 20°C for 20 minutes), cooked (for example at 95°C to 100°C for 15 to 30 minutes) and mashed. In both processes, the mashed potato is drum-dried into a thin sheet which is then ground to produce the potato flakes. Optionally, emulsifier may be added to the mashed potato before it is drum-dried.

The main difference between the flakes made by the low leach and standard processes is the level of free soluble starch, which can be measured spectrophotometrically after complexing with iodine (blue value). The low leach flakes have a higher level of free soluble starch (that is, more starch that is outside residual intact potato cells). In snack manufacture, that can lead to stickier doughs and more expanded products.

Methods of making potato granules typically include the steps of cooking potato slices until the starch is fully gelatinised, mixing the cooked potato with previously dried granules and then drying the mixture. The potato cells remain predominantly intact through the manufacturing process and the level of free soluble starch is generally relatively low in comparison to potato flake manufacture in which a significantly greater proportion of the potato cells are ruptured.

The snack food may advantageously also comprise potato flakes and/or other potato dehydrates derived from potatoes of which the starch has a normal amylopectin content. That allows

adjustment of the amylopectin content of the snack food, and thus extra control of the product texture. It is also possible, in principle, to prepare potato flakes and/or granules having a range of amylopectin contents by blending two or more types of potatoes having different amylopectin contents, for example an amylopectin (waxy) potato and a normal potato, before dehydration. Whilst it is within the scope of the invention, such blending is not considered advantageous due to the difficulty of achieving a consistent product when cooking and drying blends of potato types.

Preferably, at least 5%, and more preferably at least 10%, by weight of the snack food is derived from the high amylopectin potato flakes and/or granules. Advantageously, at least 20%, and yet more advantageously 50%, by weight of the snack food is derived from the high amylopectin potato flakes and/or granules.

Preferably, the snack food comprises one or more cereal flours. Added cereal flours, which may modify the texture and flavour of the snack food, may include one or more of, for example, wheat, maize, rice, oat or buckwheat flours.

Preferably the snack food also comprises one or more additives which are typically used in snack food manufacture, for example, flavours, cheese, leaveners, including chemical leaveners, glucose, maltodextrin, sugar, malt, whey, gluten, oil or fat and emulsifiers. Typically, those ingredients will be used in amounts not more than 10% of the dry weight of the snack

food although, where appropriate, they may represent a larger proportion of the dry weight. Cheese, in particular, may be present in amounts of up to 20% by dry weight. The amount of oil or fat added may vary widely and may, if desired, be more than 20% dry weight.

Preferably, the snack food is a fried snack food. Fried snack foods are well-known but, in the frying process, there is a tendency for the frying oil to be taken up by the snack food and, while that oil or fat can improve the texture and mouthfeel of the snack food, its presence may be considered undesirable for health or dietary reasons. Preferably, the snack food is a baked snack food. Snack foods having a decreased oil or fat content may be produced by baking instead of, or in addition to a frying step. Such snack foods, however, are generally found to have a hard, unpalatable texture. The snack foods of the present invention, in contrast, have a soft, relatively expanded texture and therefore the invention allows the preparation of potato snack foods which are palatable even when the oil or fat content is relatively low.

The snack food may be an extruded snack food, that is, the snack food may be prepared by extrusion, especially cold extrusion. In cold extrusion, the dough is shaped by forcing it under pressure through a die, with the extruded material being cut into individual pieces and cooked in a subsequent step.

The potato flake and/or granules may be used in combination with an isolated starch. Preferably, the isolated starch is a waxy starch. Advantageously, the waxy starch is a pregelatinised starch, such as pregelatinised waxy potato starch. Advantageously, the snack food according to the invention comprises not more than 25% by weight of pregelatinised waxy potato starch. Preferably, the snack food comprises not more than 10% pregelatinised waxy potato starch.

As already mentioned, the high amylopectin potato flakes and/or granules are prepared from potatoes of which the starch consists of at least 85% amylopectin, and which therefore has an amylopectin proportion that is greater than the 80% typically found in known natural potato varieties. Such potatoes are referred to herein as "high amylopectin potatoes". Potatoes produced by genetically modified potato plants and having a range of amylose contents from 0% to 23% are mentioned in an article by Bruinenberg, P. M. et al in Chemistry & Industry, November 1995, page 881 to page 884. Preferably the high amylopectin flakes and/or granules are derived from potatoes from genetically modified potato plants. It may not, however, be essential that the high amylopectin potato flakes and/or granules be made from potatoes produced by genetically modified potato plants if as envisaged suitable plants are obtained by conventional breeding.

It is especially advantageous for the high amylopectin potato flakes and/or granules to have a starch content which is substantially all amylopectin.

Preferably, the potato flakes and/or granules have been
5 prepared from potatoes from genetically modified potato plants derived from any variety suitable for snack manufacture, such as Saturna. Saturna potatoes (including their modified counterparts) may be stored for up to 9 months at 9°C without accumulating reducing sugars to such an extent that they are
10 rendered unsuitable for use in the manufacture of potato dehydrates.

Preferably the high amylopectin potato flakes and/or granules are formed from potatoes having not more than 5% by dry weight of reducing sugars. Higher reducing sugar contents are
15 considered unsuitable for use in snack food manufacture because during cooking the reducing sugars may undergo the Maillard reaction to give dark coloured and bitter tasting products. For a snack food which is derived in part from additional ingredients that do not contain significant amounts of reducing
20 sugars it will naturally be possible for the potato flakes and/or granules to have a correspondingly greater reducing sugar content.

The invention also provides potato flakes having a starch content which consists of at least 85% amylopectin. Preferably,

the potato flakes have a starch content which consists of at least 90%, preferably at least 95%, and more preferably at least 98% amylopectin.

5 The invention also provides potato granules having a starch content which consists of at least 85% amylopectin. Preferably the potato granules have a starch content which consists of at least 90%, preferably at least 95%, and more preferably at least 98% amylopectin.

10 In another aspect, the invention also provides the use of high amylopectin potato flakes and/or high amylopectin potato granules to increase the expansion of a snack food.

The invention also provides a method of preparing a snack food comprising the steps of forming a dough comprising high amylopectin potato flakes and/or high amylopectin potato
15 granules and cooking that dough to give the snack food.

Advantageously, the method also comprises the step of forming the dough into pieces of desired shape prior to cooking.

The step of forming the dough into pieces of desired shape may involve forming the dough into a sheet and cutting shaped
20 pieces from the sheet. The step of forming the dough into pieces of desired shape may be an extrusion step.

It will normally be preferred for the snack food according to the invention to have a moisture content not exceeding 4%, and more preferably not exceeding 3%, by weight based on the
25 total weight of the snack food. The conditions of the cooking

step, and in particular the time and temperature, will generally be so selected that the moisture content is reduced to the desired amount.

The manufacture of a number of snack foods will be described in Examples 1 to 7, which illustrate the invention.

Example 1

Three doughs of the following composition were prepared:

	g	<u>Approximate % Dry Mix</u>
Low Leach Potato Flakes ^{a1}	1740	98.4
Oil	15	0.9
Blend of mono & diglyceride esters of fatty acids	5	0.3
Salt	8.5	0.5
Water	1300	

10

^{a1} Three different compositions of Low Leach Potato Flakes were used for the three doughs, being, respectively 100% normal potato flakes, a 1:1 mixture of normal potato flakes and high amylopectin potato flakes or 100% high amylopectin potato flakes. The high amylopectin potato flakes were prepared entirely from modified Saturna potatoes having a starch content consisting of substantially 100% amylopectin and the normal potato flakes were prepared from conventional Saturna potatoes.

15

The dry ingredients were mixed together on a Stephan UM12 mixer for 30 seconds before adding oil and emulsifier over a period of 15 seconds, adding water gradually over a period of a minute, and mixing further to total time of 3 minutes.

5 The doughs were then sheeted to a thickness of about 0.8mm, dockered and cut into round pieces of 20mm diameter. Some of the shaped pieces were then fried at 165°C until the moisture content was below 2%. Other shaped pieces were baked at 250°C until the moisture content was below 2%.

10 It was found that an increase in the proportion of high amylopectin potato flakes gave more expanded, open products, both when fried and baked.

Example 2

15

Three doughs of the following composition having 0:1, 1:1 and 1:0 combinations of normal potato flakes and high amylopectin potato flakes were prepared according to the method given in Example 1:

	<u>g</u>	<u>Approximate % Dry Mix</u>
Low Leach Potato Flakes	1740	93.4
Oil	15	0.8
Emulsifier	5	0.3
Salt	8.5	0.5

Native potato starch	93	5
Water	1300	

The doughs were shaped as in Example 1 and the shaped pieces were baked at 240°C until the moisture content was below 2%. The elasticity, shortness and stickiness of the doughs were assessed and allocated a score using a scale from 0 to 5. For elasticity, 0 corresponds to no spring-back and 5 corresponds to immediate spring-back; for shortness 0 corresponds to a tough dough (i.e. a dough that is difficult to pull apart) and 5 corresponds to a crumbly dough; and for stickiness 0 corresponds to a non-sticky dough and 5 corresponds to extremely sticky to the touch. A combination of a shortness of 2 to 4 and an elasticity of 2 to 4 is desirable as such doughs are easier to handle. Each dough was also ranked for overall dough consistency on a scale of 1 to 9. The baked snack foods were subjected to sensory evaluation and measurement and the results are given in Table 1. Sensory evaluation was carried out by a panel of ten selected, trained and experienced people, who were required to indicate their assessment of various sensory characteristics by marking an appropriate point on a line extending from 0 to 100. The samples were tasted in a randomised order to eliminate systematic errors due to taste order, and under anonymous coding to eliminate bias.

g of high amylopectin potato flakes	Elas ^(a)	Short ^(a)	Stick ^(a)	Rank ^(b)	IFT ^(c)	Hard ^(d)	Open ^(d)	RoB ^(d)	Smooth ^(d)	Shiny ^(d)
0g	2	4	3	4	1.0	69	51	66	52	14
50g	4	2.5	4	6	1.6	59	65	74	60	21
100g	4.5	0.5	4	8	2.7	50	76	77	64	44

^(a)Elasticity, shortness and stickiness of the dough are rated on a 0 to 5 point scale.

^(b)Rank is a score between 1 and 9 given to the dough based on a "Dough Rating Scale" outlined in EP 0 324 460 B1.

^(c)Height (mm) is an average of 20 measurements taken of baked piece height. The greater the height, the greater the expansion of the product.

^(d)Hardness of Initial bite (soft=0; hard=100), Openness (closed=0; open=100), Rate of Breakdown (RoB) (slow = 0; rapid =100), Smoothness of Paste (particulate=0; smooth=100), and Shininess (dull=0; shiny=100), are sensory attributes measured by an expert sensory panel. The results given in the table are mean values.

Table 1: Test results on the baked snack foods of Example 2

Example 3

Six doughs were prepared by the method of Example 1
5 according to the following composition:

	g	% Dry Mix
Low Leach Potato Flakes ^{a)}	1470	78
Oil	15	0.8
Emulsifier	5	0.3
Salt	8.5	0.5
Starch ^{b)}	372	20
Water	1300	

10 a) The Low Leach potato flakes used were either 100% normal potato flakes or a 1:1 combination of normal potato flakes and high amylopectin potato flakes.

b) Four potato starches were used as follows: native non-waxy; pregelatinised non-waxy; native waxy; and pregelatinised waxy.

15

The doughs were shaped and baked as in Example 2. The baked snack foods were tested and the results are given in Table 2.

% of high amylopectin potato flake	Starch	Elas ^(a)	Sht ^(a)	Stck ^(a)	Rank ^(b)	Ht ^(c)	Hard ^(d)	Open ^(d)	RoB ^(d)	Sm ^(d)	shiny ^(d)
0%	Native Waxy	2.5	4	1	3	1.1	71	47	67	52	17
0%	Pregel Waxy	4.5	0.5	4	8	1.1	67	54	68	50	14
50%	Native Non-Waxy	4	2	1.5	6	1.2	66	58	71	60	13
50%	Native Waxy	3	2	3.5	5	1.2	61	61	71	60	22
50%	Pregel Non Waxy	4.5	1.5	3	6	1.5	71	60	68	54	17
50%	Pregel Waxy	4.5	0	5	9	1.7	65	71	71	54	27

18

^(a)Elasticity, shortness and stickiness of the dough are rated on a 0 to 5 point scale.

^(b)Rank is a score between 1 and 9 given to the dough based on a "Dough Rating Scale" outlined in EP 0 324 460 B1.

^(c)Height (mm) is an average of 20 measurements taken of baked piece height. The greater the height, the greater

5 the expansion of the product.

^(d)Hardness, Openness, Rate of Breakdown (RoB), Smoothness of Paste, and shininess are sensory attributes measured by an expert sensory panel. The mean results are given in the table.

Table 2: Test results on the baked snack foods of Example 3

Example 4

Snack foods were prepared according to the process of Example 2 but the low leach potato flakes were replaced with standard potato flakes. The results of measurements carried out on the baked snack foods are given in Table 3.

% of high amylopectin potato flake	Elast ^(a)	Short ^(a)	Stick ^(a)	Rank ^(b)	Height (mm)
0%	0	5	0.5	1	0.5
50%	2	4	2	3	1
100%	3	3	3.5	5	2

^(a)Elasticity, shortness and stickiness of the dough are rated on a 0 to 5 point scale.

^(b)Rank is a score between 1 and 9 given to the dough based on a "Dough Rating Scale" outlined in EP 0 324 460 B1.

Table 3: Results of tests carried out on
the snack foods of Example 4

The high amylopectin potato flake prepared by the standard process was found to give more open baked products with improved breakdown and clearance compared to snack foods prepared using normal potato flakes prepared by the standard process.

Example 5

Snack foods were prepared using potato flake in combination with wheat flour, to the following composition:

	g	% Dry Mix
5 Low Leach Potato Flake ^(a)	863	45
Flour \		
(Low Protein, Biscuit Type)	933	49
Fat	95	5
-0 Emulsifier ^(b)	8.6	0.5
Salt	8.6	0.5
Water ^(c)	1107, 1254	

15 ^(a)Two different compositions of Low Leach Flakes were used for the two doughs, the first being 100% normal potato flakes and the other 100% high amylopectin flakes. The high amylopectin flakes were as described in Example 1.

^(b)The emulsifier used was DATEM (di-acetyltartaric acid esters of mono- and di-glycerides of fatty acids).

20 ^(c)The water level used was the lower level for the normal potato flakes and the higher level for the high amylopectin flakes.

The dry ingredients were mixed together in a Hobart (CC/DD 12 BM EG JN5) mixer for 30 s at speed 1 before adding the water followed by the fat and emulsifier. The whole dough was then
25 mixed to a total of 6 min at speed 2.

The doughs were then shaped and baked as described in Example 2.

It was found that the high amylopectin flake products gave more expansion (piece height 1.3mm as compared to 0.9mm) and were softer, more open with improved melt in the mouth.

Example 6

Potato flake was used in combination with corn polenta (fine maize flour) to produce baked snack products, to the following composition:

	g	% Dry Mix
Low Leach Potato Flake ^(a)	863	45
Fine Corn Polenta	933	49
15 Fat	95	5
Emulsifier ^(b)	8.6	0.5
Salt	8.6	0.5
Water ^(c)	1107,1254	

20 ^(a)Two different compositions of Low Leach Flakes were used for the two doughs, the first being 100% normal potato flakes and the other 100% high amylopectin flakes. The high amylopectin flakes were as described in Example 1.

^(b)The emulsifier used was DATEM (di-acetyltartaric acid esters of mono- and di-glycerides of fatty acids).

^(c)The water level used was the lower level for the normal potato flakes and the higher level for the high amylopectin flakes.

The doughs were prepared as described in Example 5. The doughs were then shaped and baked as described in Example 2.

5 The high amylopectin flake products were found to give greater overall expansion (piece height 1.3mm as compared to 0.8mm) and the expansion was more even. The products were softer, more open with improved melt in the mouth and faster clearance.

10

Example 7

Snack products were produced through a forming extruder, the doughs used incorporated potato flake in the following
15 formulation:

	g	% Dry Mix
Standard Potato Flake ^(a)	400	22
Normal Potato Granules	570	31
Native Potato Starch	845	46
20 Salt	3.75	0.2
Water	1150	

^(a)Two different compositions of Standard Potato Flakes were used for the two doughs, the first being 100% normal potato flakes

and the other 100% high amylopectin flakes (produced from modified Saturna potatoes having substantially all amylopectin).

The dry ingredients were mixed together for 2 min (same mixer described in Example 5) at speed 1. The water was then
5 added whilst mixing over a 30 s period, mixing was continued for a total mix time of 4 min.

600g of dough was used to charge the extruder barrel of a piston extruder, 1kg of dough was then added to the barrel and extruded out at a pressure of 60 bar through a die. The
9 extrudate was cut into pieces at a cutter speed of 1750 rpm. The pieces were fried at 190°C until the moisture content was below 2%.

The dough containing the high amylopectin flakes extruded faster than that containing the normal flakes (1.6kgmin^{-1}
15 compared to 0.6kgmin^{-1}), hence giving a greater process throughput. The high amylopectin potato flakes gave more open, more expanded snack products with a softer but crunchier texture. The expansion of the extruded snacks using the high amylopectin flakes increased by 7%.

Claims

1. A snack food comprising high amylopectin potato flakes and/or high amylopectin potato granules.
- 5 2. A snack food as claimed in claim 1, wherein the high amylopectin potato content is substantially all in the form of potato 'flakes.
3. A snack food as claimed claim 1 or claim 2, which also comprises potato flakes and/or other potato dehydrates derived
10 from potatoes of which the starch has a normal amylopectin content.
4. A snack food as claimed in any of claims 1 to 3, wherein at least 5% by weight of the snack food is derived from the high amylopectin potato flakes and/or granules.
- 15 5. A snack food as claimed in any of claims 1 to 4, which also comprises one or more cereal flours.
6. A snack food as claimed in any of claims 1 to 5, which also comprises one or more additives typically used in snack food manufacture.
- 20 7. A snack food as claimed in any of claims 1 to 6, wherein the snack food is a fried snack food.
8. A snack food as claimed in any of claims 1 to 6, wherein the snack food is a baked snack food.
9. A snack food as claimed in any of claims 1 to 8, wherein
25 the snack food is an extruded snack food.

10. A snack food as claimed in any one of claims 1 to 9, which also comprises an isolated starch.
11. A snack food as claimed in claim 10, wherein the isolated starch is a waxy starch.
- 5 12. A snack food as claimed in claim 11, wherein the waxy starch is a pregelatinised waxy starch.
13. A snack food as claimed in claim 12, which comprises not more than 25% by weight of pregelatinised waxy potato starch.
14. A snack food as claimed in claim 13, which comprises not
10 more than 10% by weight of pregelatinised waxy potato starch.
15. A snack food as claimed in any of claims 1 to 14, wherein the high amylopectin potato flakes and/or granules are prepared from potatoes from genetically modified potato plants.
16. A snack food as claimed in claim 15, wherein the modified
15 potato plants are derived from the Saturna variety.
17. A snack food as claimed in any of claims 1 to 16, wherein the high amylopectin potato flakes and/or granules are derived from potatoes having not more than 5% by dry weight of reducing sugars.
- 20 18. A snack food comprising high amylopectin potato flakes and/or high amylopectin potato granules and substantially as described in Examples 1 to 6.
19. Potato flakes having a starch content which consists of at least 85% amylopectin.

20. Potato flakes as claimed in claim 19, wherein the starch content consists of at least 90% amylopectin.
21. Potato granules having a starch content which consists of at least 85% amylopectin.
- 5 22. Potato granules as claimed in claim 21, wherein the starch content consists of at least 90% amylopectin.
23. Use of high amylopectin potato flakes and/or high amylopectin potato granules to increase the expansion of a snack food.
- 10 24. A method of preparing a snack food comprising the steps of forming a dough comprising high amylopectin potato flakes and/or high amylopectin potato granules and cooking that dough to give the snack food.
25. A method as claimed in claim 24, which also comprises the
- 15 step of forming the dough into pieces of desired shape prior to cooking.
26. A method as claimed in claim 25, wherein the step of forming the dough into pieces of desired shape involves forming the dough into a sheet and cutting shaped pieces from the sheet.
- 20 27. A method as claimed in claim 25, wherein the step of forming the dough into pieces of desired shape is an extrusion step.
28. A method as claimed in any one of claims 24 to 27, wherein in the step of forming the dough the high amylopectin flakes

and/or granules are added in an amount such that they comprise at least 10% of the dry weight of the dough.

29. A method as claimed in any one of claims 24 to 28, wherein, in the step of forming the dough, one or more cereal flours are added.

30. A method as claimed in any one of claims 24 to 29, wherein the cooking step comprises a frying step.

31. A method as claimed in any one of claims 24 to 30, wherein the cooking step comprises a baking step.

10 32. A method as claimed in any one of claims 24 to 29, wherein the cooking step comprises extrusion cooking.

33. A method of preparing a snack food substantially as described in examples 1 to 7.

INTERNATIONAL SEARCH REPORT

Inte Application No
PCT/NL 00/00167

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23L1/2165 A23L1/0522 A23L1/217 A23L1/164

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	VRIES DE J A: "NIEUWE MOGELIJKHEDEN MET AMYLOPECTINE-AARDAPPELZETMEEL" VOEDINGSMIDDELEN TECHNOLOGIE, NL, NOORDERVLIET B.V. ZEIST, vol. 28, no. 23, 1 November 1995 (1995-11-01), pages 26-27, XP002063172 ISSN: 0042-7934 the whole document	1-9, 15, 18, 21-33
X	GB 1 232 497 A (PROCTER & GAMBLE) 19 May 1971 (1971-05-19) example III	1-4, 6, 7, 18

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1232497 A	19-05-1971	AT 293153 B	15-08-1971
		BE 725426 A	13-06-1969
		CH 512889 A	30-09-1971
		DE 1792645 A	25-11-1971
		ES 361232 A	16-08-1970
		FR 1599239 A	15-07-1970
		NL 6818002 A	17-06-1969
		SE 343198 B	06-03-1972